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Power Innovation
Stromversorgungstechnik GmbH

AC-DC Converter REC7200-230-48/60-K30

Modular Battery Charger

General description

Thanks to the variety of modules available, the REC7200 system offers the perfect solution for all areas of application requiring a power output of up to 7.2 kW.

Starting up from a minimum equipment for 800 watts, the system can be expanded with additional modules to a higher-performance or even redundant system to grow with the requirements of your application. With easily integrable controller monitoring and remote control functions, the REC7200 system allows design and setup of appropriate system solutions, for example for outdoor telecommunication systems.

Picture may differ from actual device

Further features:

- 19“, 6 U subrack, also suitable for installation in ETSI racks or cabinets
- Redundant rectifier modules (800 W each)
- Optionally two redundant battery modules (2400 W each) or one battery module (7200 W) for UPS function
- Short-term UPS module based on Super-Cap capacitors (available on request)
- Inverter module for a secured, uninterruptable supply of AC loads
- Universal DCDC module (48 V ↔ 60 V)
- Connector panel for 3-phase mains connection and 4 x DC_{OUT} (electronically monitored); additionally one unsecured DC output for an external distribution; all connections are located on the front
- Optional distribution module providing four additional DC outputs (electronically monitored)
- Comprehensive controller functions such as alarm contacts, LAN ports and a web interface

Electrical data – input

Mains voltage	U_N = 3 x 230 V_{AC}, 50/60 Hz
Voltage range	+/-20 % (184 – 276 V_{AC})
Frequency range	47 – 63 Hz, sine wave
Mains connection	1–3-phase, neutral conductor via 2 contacts
Commercial power line	TT and TN grid (EN 60950)
Power factor	0.99 at nominal load

Electrical data – output

Output voltage	48 V_{DC} (60 V_{DC}) potential-free
Output power	800 W – 7200 W, depending on expansion stage, without derating up to 60 °C ambient temperature
Output current	OUT 1 – OUT 4: max. 20 A each (electronically monitored); OUT 5: max. 150 A (unsecured)
Output voltage tolerance	acc. to the temperature-controlled battery charging characteristic
Output characteristic	UI characteristic
Output ripple	< 100 mVpp
Efficiency	> 93 % at nominal load

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Dipl.-Ing. Bernhard Böden

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AC-DC Converter REC7200-230-48/60-K30

Modular Battery Charger

Mechanical data

Version	Suitable for mounting in 19“ and ETSI racks (flanges for ETSI available)
Dimensions (W x D x H)	19“ x 240 mm x 6 U
Weight	Sub-rack with connector panel and controller: approx. 10 kg Single rectifier module: approx. 1.7 kg

Cooling

Rectifier module	Forced ventilation with fan failure detection

Protective functions

DC output	Overvoltage protection, repetitive trace function, tripping value: ≤ 60 V_{DC} (48 V system) ≤ 72 V_{DC} (60 V system)
DC output short-circuit current	I_{sc} = 16 A (48 V system) I_{sc} = 13 A (60 V system) per rectifier module (without battery), short-circuit-proof
Leakage current	A fixed protective earth (PE) connection is obligatory

Connector terminals

AC input	Phoenix SPC5/5-STF-7,62 5-pole
Grounding bolt	M8
DC outputs 1 – 4	Phoenix Front 2,5-H/SA10
DC output 5, unsecured	Phoenix HDFKV50 lead-through terminal
Battery terminal	Phoenix HDFK10 / HDFKV50 (depending on power version)
Signals	2 x Phoenix FK-MC 0,5/10-ST-2,5, each 10-pole
Ethernet (LAN)	2 x RJ45 connector

Signalling

Optical: controller module	LED green: OK LED red: common alarm
Optical: rectifier module	LED green: AC OK LED green: DC OK
Electrical: controller module	3 external alarm inputs
	3 programmable, potential-free relay contacts, each 3-pole led-out (COM-NC-NO), contact load max. 80 V_{DC}, 500 mA via signal connector
	2 inputs for PT1000 sensors
Electrical: battery connection module	1 input for PT1000 sensor (per Module)

EMC, safety

EMC emission	EN 61000-6-3
EMC immunity	EN 61000-6-2
Electrical safety	EN 60950
Protection class	1
Isolation group	Pollution degree 2

Environmental conditions

Ambient temperature during operation	-25 °C to +60 °C
Maximum ambient temperature	+70 °C, from +60 °C upwards derating of 2.5%/K
Relative air humidity	Up to 100 %, start-up after drying
Protection	IP 20

Warranty **24 months**

Order code **REC7200-230-48-z-K30**
REC7200-230-60-z-K30

(z = number of rectifier modules included)

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AC-DC Converter REC7200-230-48/60-K30

800 W Rectifier Module for the REC7200

General description

The rectifier modules of the types MREC800-230-48-K30-HE (U_{OUT} = 48 V_{DC}) and MREC800-230-60-K30 (U_{OUT} = 60 V_{DC}) for installation in the REC7200 sub-rack are hot pluggable, i.e. they can be mounted in the sub-rack or extracted during operation.

The decoupling of single rectifier modules realized via a diode function (MOSFET transistors) and the active load sharing among the modules with the resulting module redundancy provide a system with a very high availability.

Picture may differ from actual device

Electrical data – output

Nominal voltage	40 – 58 V_{DC} (48 V module) 50 – 72 V_{DC} (60 V module) CAN bus controlled
Output power	Max. 800 W
Output current	Max. 16 A / 13 A
Efficiency	93.5 % at nominal load (48 V system)
Output characteristic	UI characteristic
Output ripple	< 100 mVpp
Parallel operation	Redundant decoupling of the modules via diode function
Load sharing	Active, accuracy ±10 %

Signalling

LED green	AC OK
LED green	DC OK

Order code **MREC800-230-48-K30-HE**
MREC800-230-60-K30

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AC-DC Converter REC7200-230-48/60-K30

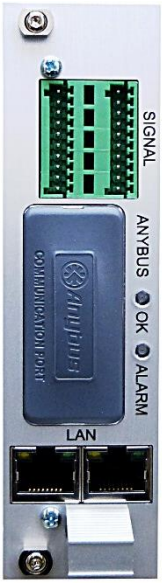
Controller Module for the REC7200

General description

The controller module is used for controlling and monitoring the REC7200 system via the internal CAN bus. The module provides two RJ45 Ethernet connectors (LAN) for connection with a local PC or network. A clear and easy-to-operate user interface facilitates the control, programming and monitoring of all relevant system parameters.

Further features:

- **Hot plug-in capability**
- **No AC/DC power supply interruption in case of a controller failure**
- **Output voltage control via temperature dependent charging characteristic**
- **External alarm inputs**
- **Freely programmable alarm relays**
- **PCBs protected against humidity**
- **Web interface and SNMP function integrated**
- **Slot for Anybus module M30**



Picture may differ from actual device

Signals

External alarm inputs	3 x (e.g. door contacts, relays of other devices)
Alarm outputs	3 x (potential-free, freely programmable)
External temperature monitoring	2 x PT1000

Connector terminals

Signals	2 x Phoenix FK-MC 0,5/10-ST-2,5, each 10-pole
Ethernet (LAN)	2 x RJ45 connector

Optical signalling

LED green	OK
LED red	alarm (common alarm)

LAN interfaces

Specifications	IEEE 802.3™ compatible Ethernet Controller, 10/100Base-T Port
Supported network protocols	IPv4, HTTP, SNMPv1 and v2c, DHCP, NTP, ICMP

Order code **MCON-48-60-K30**

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AC-DC Converter REC7200-230-48/60-K30

2400W Battery Connection Module for the REC7200

General description

The battery connection module (power version 2400 W) is required for connecting a battery to the REC7200 system. Two modules of this type can be used simultaneously so that the battery power of 2400 W is available redundantly.

The module includes the battery connector, battery fuse and LVD relay as well as the connectors for symmetry measuring lines and temperature monitoring (PT1000 sensor).

The integrated control electronics for battery management enables functions such as symmetry monitoring, current measurement and temperature-controlled charging characteristics.

Further features:

- **CAN bus controlled**
- **Programmable charging characteristics**
- **Programmable LVD relay**
- **Battery temperature detection**
- **Automatic battery tests**

Picture may differ from actual device

Battery connection

Nominal voltage	48 V_{DC} / 60 V_{DC}
Max. output current	50 A
Fuse	2-pole, magneto-hydraulic
Deep-discharge protection	Via LVD relay (Low Voltage Disconnect)
Battery connection	Phoenix HDFK10
Symmetry measurement	Phoenix MC1,5/6-G-3,5-RN (10 kΩ required in the measuring lines)
Temperature sensor	PT1000
Recommended power reserve for battery charging	500 W

Signalling

LED green	OK
LED red	Failure

Order code	**MBATT2400-48-K30**

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AC-DC Converter REC7200-230-48/60-K30

7200W Battery Connection Module for the REC7200

General description

The battery connection module (power version 7200 W) is required for connecting a battery to the REC7200 system. It occupies both battery slots and enables the supply of a maximum battery power of 7200 W for UPS function.

The module includes the battery connector, battery fuse and LVD relay as well as the connectors for symmetry measuring lines and temperature monitoring (PT1000 sensor).

The integrated control electronics for battery management enables functions such as symmetry monitoring, current measurement and temperature-controlled charging characteristics.

Further features:

- **CAN bus controlled**
- **Programmable charging characteristics**
- **Programmable LVD relay**
- **Battery temperature detection**
- **Automatic battery tests**

Battery connection

Nominal voltage	48 V_{DC} / 60 V_{DC}
Max. output current	150 A
Fuse	2-pole, magneto-hydraulic
Deep-discharge protection	Via LVD relay (Low Voltage Disconnect)
Battery connection	Phoenix HDFKV50
Symmetry measurement	Phoenix MC1,5/6-G-3,5-RN (10 kΩ required in the measurement lines)
Temperature sensor	PT1000
Recommended power reserve for battery charging	1500 W

Signalling

LED green	OK
LED red	Failure

Order code	**MBATT7200-48-K30**

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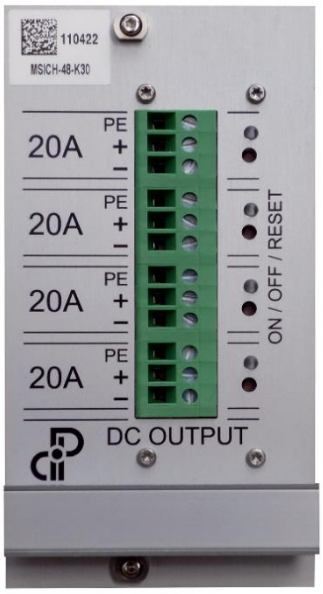
AC-DC Converter REC7200-230-48/60-K30

Electronic distribution module for the REC7200

General description

The distribution module permits an electronically controlled distribution via four DC outputs. Each output is electronically overcurrent-protected. The module shall be used, if the number of outputs of the connector panel is not sufficient.

The tripping current is adjusted via the web interface. After tripping, the output can be reset manually by means of a push button. Alternatively, a reset is also possible via web interface. All outputs can be switched individually. To save battery capacity, certain outputs can be switched off – for example – by means of a time-control command or triggered by a power supply failure. In this case, the shutdown can take place immediately or with a certain delay. The current output can be read off in the monitoring software for each single output.



Picture may differ from actual device

Further features:

- **CAN bus controlled**
- **All four outputs are electronically protected**
- **Programmable tripping current**
- **Current measurement at each output**
- **Outputs separately switchable**
- **Reset manually or remotely**
- **Function display via LED**

Outputs (electronically protected)

DC OUT 1	0 – 20 A, adjustable
DC OUT 2	0 – 20 A, adjustable
DC OUT 3	0 – 20 A, adjustable
DC OUT 4	0 – 20 A, adjustable
	continuous load per output: 75 % of I_{MAX}
Max. sum current	60 A
Plug connector	Phoenix Front 2,5-H/SA10

Signalling

LED green	Operation
LED red	Failure, shutdown

Reset

Manually via reset button (protected against unintentional actuation) or remotely via web interface.

Order code **MSICH-48-K30**

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AC-DC Converter REC7200-230-48/60-K30

Inverter Module for the REC7200

General description

Inverter module for a secure and uninterrupted supply of AC loads. The plug-in module provides a 230V_{AC}/50Hz sine-wave output signal supplied by the DC bus system. It can be used in a 48 V system as well as in a 60 V system. The load connection is carried out at the module's front panel.

Further features:

- **CAN bus controlled**
- **Hot plug-in capability**
- **Temperature range -25°C to +70°C**
- **Controlled and monitored fan**
- **PCBs protected against humidity**
- **Real SINE output**
- **Short-circuit protected**

Picture may differ from actual device

Electrical data – output

Output voltage	230 V_{AC}
Frequency	50 Hz, sine-wave processor-controlled
Output power	500 VA / 400 W
Power factor	0.8
Crest factor	> 2.5
Harmonic distortion	< 5 %
Load range	0 % – 100 %
Overload range	101 % – 150 %, tolerated for 30 s to 3 s
Efficiency	> 88 % at nominal load

Connector terminals

Output	Phoenix MC1,5/3-GF-5,08

Signalling

LED green	Output OK
LED yellow	Warning (excessive temperature, fan failure)
LED red	Alarm, output switched off (overload, short-circuit, excessive temperature, AC UVP/OVP)

Order code **MINV500-48-230-K30**

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AC-DC Converter REC7200-230-48/60-K30

DCDC Module for the REC7200

General description

The bidirectional DCDC converter is powered by the DC bus system. It provides a 48 V_{DC} or 60 V_{DC} output voltage at its front panel. Thus, a 60 V_{DC} load can be supplied by a 48 V_{DC} system and a 48 V_{DC} load can be supplied by a 60 V_{DC} system. Alternatively, an external voltage (38 – 72 V_{DC}) can be fed into the system via the converter.

MDCDC1500-48-60-K30

(in development)

Further features:

- **CAN bus controlled**
- **Hot plug-in capability**
- **High efficiency of 97 %**
- **Controlled and monitored fan**
- **Output voltage adjustable**
- **Operation mode „feeding-in“**
- **U_{IN} = 38 – 72 V_{DC}**

Electrical data – output

Output voltage	20 - 68 V_{DC}
Max. output current	30 A
Output power	1500 W
Efficiency	> 97 % at nominal load

Connector terminals

Output	Phoenix PC5/2-GF-7,62

Signalling

LED green	Output OK
LED yellow	Warning, overload within the range of tolerance
LED red	Alarm, output switched off

Order code **MDCDC1500-48-60-K30**

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